

NOMENCLATRURAL COMBINATIONS IN THE *ANDROPOGON GERARDII*
COMPLEX (POACEAE: ANDROPOGONEAE)

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ABSTRACT

The following nomenclatural changes in Poaceae are proposed:
Andropogon gerardii F. Vitman subsp. *hallii* (E. Hackel) *comb. et stat. nov.*; *Andropogon gerardii* F. Vitman subsp. × *chrysocomus* (G. Nash) *comb. et stat. nov.*; and *Andropogon hondurensis* (R. Pohl) *comb. et stat. nov.* A key is provided to separate the taxa.

KEY WORDS: *Andropogon*, *Andropogon chrysocomus*, *Andropogon gerardii*, *Andropogon gerardii* subsp. × *chrysocomus*, *Andropogon gerardii* subsp. *hallii*, *Andropogon gerardii* var. *hondurensis*, *Andropogon hallii*, *Andropogon hondurensis*, Andropogoneae, nomenclature, Poaceae

Andropogon gerardii F. Vitman subsp. *hallii* (E. Hackel) J. Wipff, *comb. et stat. nov.* BASIONYM: *Andropogon hallii* E. Hackel, Sitzungsberichte der Kaiserlichen Akademie der Wissenschaften, Mathematisch-naturwissenschaftliche Classe, Abteilung 1, 89:127. 1884. *Andropogon hallii* E. Hackel var. *flaveolus* E. Hackel, Sitzungsberichte der Kaiserlichen Akademie der Wissenschaften, Mathematisch-naturwissenschaftliche Classe, Abteilung 1, 89:128. 1884. *Sorghum hallii* (E. Hackel) K.E.O. Kuntze, *Revisio Generum Plantarum* 2:791. 1891. TYPUS: UNITED STATES. Nebraska: 1862, E. A. Hall & J. P. Harbour 651 (Isotype: NY!,US!).

Andropogon hallii E. Hackel var. *incanescens* E. Hackel, Sitzungsberichte der Kaiserlichen Akademie der Wissenschaften, Mathematisch-naturwissenschaftliche Classe, Abteilung 1, 89:128. 1884. TYPUS: Unknown.

Hackel, in 1884, only listed one collection (E. A. Hall & J. P. Harbour 651) after the description of both var. *flaveolus* and var. *incanescens*. He separated the two taxa by spikelet length and inflorescence pubescence color: yellow (var. *flaveolus*) or white-gray (var. *incanescens*). Since the cited

specimen has golden yellow pubescence, the type specimen then must refer to var. *flaveolus* (= var. *hallii*) and not var. *incanescens*.

Andropogon hallii E. Hackel var. *muticus* E. Hackel, in A.L. De Candolle & C. De Candolle (Eds.), *Monographiae Phanerogamarum* [Andropogoneae] 6:444. 1889. TYPUS: UNITED STATES. Colorado: Brighton, G. Vasey (Isotype: US).

Andropogon geminata E. Hackel ex W. Beal, *Grasses of North America* 2:55. 1896. TYPUS: UNITED STATES. Texas: G. Nealley (Isotype: US!).

Andropogon paucipilus G. Nash, in N. Britton, *Manual of the Flora of the Northern United States and Canada* 70. 1901. *Andropogon provincialis* J. de Lamarck var. *paucipilus* (G. Nash) M. Fernald & L. Griscom, *Rhodora* 37:147. (1935). *Andropogon gerardii* F. Vitman var. *paucipilus* (G. Nash) M. Fernald, *Rhodora* 42:258. 1943. TYPUS: UNITED STATES. Nebraska: Grant Co., In the Lake Region of Grant County, 3 miles N.E. of Whitman, in valley, 31 July 1893, P.A. Rydberg 1607 (LECTOTYPE: NY!).

Nash (1901) did not cite any specimens, so the above specimen can not be the holotype [Article 9.1 and Note 1 (*International Code of Botanical Nomenclature*, 1994)]. Nash (1912) did designate a lectotype for this name by effectively publishing [Articles 7.10 and 7.11 (*International Code of Botanical Nomenclature*, 1994)] the following type information, "TYPE LOCALITY: Three miles northeast of Whitman, Grant Co. Nebraska." There is only one specimen at NY in the type collection with this information on the label, therefore this specimen is the lectotype for *Andropogon paucipilus*. There is another specimen at NY with the same collector and collection number (P.A. Rydberg 1607) as the lectotype, but it has a different location (Nebraska; Hooker Co.) and collection date (27 July 1893). This specimen is not the type and has caused some confusion. The specimen at US, designated as the type, is the same as the second specimen at NY (Nebraska, Hooker Co., 27 July 1893, P.A. Rydberg 1607), so the specimen at US is not a type specimen.

Andropogon gerardii F. Vitman subsp. \times *chrysocomus* (G. Nash) J. Wipff, *comb. et stat. nov.* [*A. gerardii* subsp. *gerardii* \times *A. gerardii* subsp. *hallii*]. BASIONYM: *Andropogon chrysocomus* G. Nash in N. Britton, *Manual of the Flora of the Northern United States and Canada* 70. 1901. *Andropogon provincialis* J. de Lamarck var. *chrysocomus* (G. Nash) M. Fernald & L. Griscom, *Rhodora* 37:147. 1935. *Andropogon gerardii* F. Vitman var. *chrysocomus* (G. Nash) M. Fernald, *Rhodora* 45:258 1943. TYPUS: UNITED STATES. Kansas: Stevens County, M.A. Carleton 343 (LECTOTYPE: NY!).

Nash (1901) did not cite any specimens, so the above specimen can not be the holotype [Article 9.1 and Note 1 (*International Code of Botanical Nomenclature*, 1994)]. Nash (1912) did designate a lectotype for this name by effectively publishing [Articles 7.10 and 7.11 (*International Code of Botanical Nomenclature*, 1994)] the following type information, "TYPE LOCALITY: [Stevens County]. Kansas." There is only one specimen at NY in the type collection, so this specimen is the lectotype for *A. \times chrysocomus*.

The specimen at US designated as the type has the same location, collector and collection number, but a different collection date (24 July 1891). Also, this US specimen is *Andropogon gerardii* subsp. *hallii*, not *A. gerardii* subsp. \times *chrysocomus*.

Andropogon gerardii subsp. *gerardii* and subsp. *hallii* are morphologically distinct

and occupy different habitats, but morphological intergradation between these taxa in sympatric areas has been well documented (Romberg 1954; Satterwhite 1970; Kestner 1973; Barnes 1986). Subspecies *gerardii* is widely distributed in moist prairie sites in North America while subsp. *hallii* is restricted to sandy soils in the Great Plains (Chase 1951). In Nebraska, subsp. *gerardii* is confined to mesic, subirrigated Sandhill meadows or to finer textured soils in higher precipitation areas outside the Sandhills, whereas subsp. *hallii* is restricted to coarse textured soils in the Sandhills Region (Pool 1914; Tolstead 1942; Satterwhite 1970; Kestner 1973; Barnes 1986). Romberg (1954) found plants intermediate in morphology (subsp. \times *chrysocomus*) growing on disturbed roadsides in the Sandhills. Kestner (1973) found subsp. \times *chrysocomus* on isolated dune systems outside of the Sandhills. Barnes (1986) found that in the Sandhills (Nebraska) subsp. *hallii* was restricted to the upland sand dunes, subsp. *gerardii* to adjacent, subirrigated meadows, and subsp. \times *chrysocomus* was only found in narrow zones of 5-10 m in width at dune/meadow interfaces, between subsp. *gerardii* and subsp. *hallii*.

In a reciprocal transplanting experiment using seedlings and adult plants, Barnes (1985) found severe mortality occurred in all of the subspecies on the dry, upland dunes, but was especially pronounced in subsp. *gerardii* and \times *chrysocomus*. Likewise, when subsp. *hallii* was transplanted into the meadows there was also a high mortality. Barnes (1985) suggested that selection for drought resistant genotypes could be an important mechanism controlling habitat assortment of bluestem types along this gradient.

Barnes (1986), studying the *Andropogon gerardii* complex along a dune/meadow gradient, reported considerable variation and intergradation in morphology in the complex along the gradient. However, there was very little overlap between the dune (ridge and mid-slope), subsp. *hallii*, and meadow (high and low meadow), subsp. *gerardii*, populations in morphological characters commonly used to separate the two taxa. Subspecies *gerardii* populations had: 1) awns 12.1-21.3 mm long; 2) ligule 0.8-2.3 mm long; 3) inflorescence pubescence was sparse and pale, and 2.2-4.2 mm long; and 4) rhizome internodes not exceeding 2 mm in length. Subspecies *hallii* populations had: 1) awns absent or present, if present less than 8 mm long; 2) ligule 2.5-4.4 mm long; 3) inflorescence pubescence was dense, yellow, and 3.7-6.6 mm long; and 4) rhizome internodes often exceeding 20 mm in length. Barnes (1986) also reported that plants collected at the low slope and transition (dune/meadow interface) sites were morphologically intermediate between subsp. *gerardii* and subsp. *hallii*, and it was concluded that these were the result of hybridization between subsp. *gerardii* and subsp. *hallii*.

Artificial hybridization experiments between subsp. *gerardii* and subsp. *hallii* showed that the two taxa were completely interfertile and produced fertile progeny with morphological characters intermediate between the two parents (Peters & Newell 1961). These taxa also interbred naturally when placed in close proximity to one another in gardens (Newell & Peters 1961). Newell & Peters (1961) reported that the cross compatibility of the two subspecies, and resulting hybrid vigor and fertility of the progeny was such that hybridization between superior clones of the two taxa offered the "opportunity for improvement through the development of synthetic varieties [commercial] and hybrid combinations of characters essential for increased utilization of bluestem as a forage crop." This work led to the development and

release of a commercial variety, "Champ" Bluestem (Newell 1968), which is a hybrid (subsp. \times *chrysocomus*) between subsp. *hallii* and subsp. *gerardii*.

Andropogon hondurensis (R. Pohl) J. Wipff, *comb. et stat. nov.* BASIONYM: *Andropogon gerardii* F. Vitman var. *hondurensis* R. Pohl, in G. Davidse & R. Pohl, *Novon* 2(2):108. 1992. TYPUS: HONDURAS. Road to Teupasenti, open pine forest, 1,350 m, 22 June 1980, R.W. Pohl & L.G. Clark 14011 (HOLOTYPE: ISC!).

Davidse & Pohl (1992) separated *Andropogon gerardii* var. *hondurensis* from the rest of the *A. gerardii* complex by the following characters: 1) plants smaller and more slender; 2) smaller sessile spikelets averaging ca. 5 mm; and 3) lower glumes of the sessile spikelets are flat, while those of *A. gerardii* found in Canada, the United States, and México are sulcate. Shape of the first glume of the sessile spikelet is a very important diagnostic character in the Andropogoneae.

Clayton & Renvoize (1986) considered the shape of the sessile spikelet lower glume to be the main source of variation in *Andropogon* and based their sectional classification on this character. The first glume of the sessile spikelet of *A. hondurensis* is significantly different from that of *A. gerardii*. The first glume of *A. hondurensis* is flat with intercarinal veins in the center of the glume, whereas the first glume of *A. gerardii* is conspicuously grooved (sulcate) and without intercarinal veins in the groove. The difference between the first glume of the sessile spikelet of *A. hondurensis* and *A. gerardii* alone justify the recognition of *A. hondurensis* at the specific level. In addition there is a significant difference in anther length between *A. hondurensis* (1.0-1.2 mm long) and *A. gerardii* [(2.3-) 2.5-6.0 mm long].

Key to the *Andropogon gerardii* complex and *A. hondurensis*

1. First glume flat to slightly concave, intercarinal veins present in center of the glume; anthers of sessile spikelet 1.0-1.2 mm long; sessile spikelet 5.0-5.3 mm long; endemic to Central America (Belize, Honduras, and Costa Rica).....
.....*A. hondurensis*
1. First glume distinctly grooved, intercarinal veins absent in the center of the glume (the groove); anthers of sessile spikelet (2.3-)2.5-6.0 mm long; sessile spikelet 5-12 mm long; found in México, United States and Canada.....2
2. Second (upper) lemma awnless or with a straight, untwisted awn to 11 mm long.*A. gerardii* subsp. *hallii*
2. Second (upper) lemma awned with a basally tightly twisted and once geniculate awn, awn (7.5)10.0-25.0 mm long.....3
3. Rhizomes usually absent, but if present then short, and the rhizome internodes 2 mm or less in length; pubescence on internodes and pedicels in inflorescence sparse to dense, white or sometimes yellow, pubescence 1.5-4.2 mm long.....*A. gerardii* subsp. *gerardii*
3. Rhizomes present, internodes more than 2 mm in length; pubescence on internodes and pedicels in inflorescence dense, yellow, pubescence 3-6 mm long.....*A. gerardii* subsp. \times *chrysocomus*

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